Agriculture and Agri-Food Canada | Agriculture et Agroalimentaire Canada

The North American Drought Monitor

AAFC National Agroclimate Information Service

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Canada

National Agroclimate Information Service

- Operational near real time monitoring of agroclimate
  - Inform the industry, Dept., public
  - Support to programs and response
- Application and integration of research into end user products:
  - Decision support & risk management
  - Data products (some used by research)
- Liaison with Environment Canada
  - Climate analysis, data exchange, climate service integration
- Liaison with international community
  - United States & Mexico: NADM, NACSP

Vulnerability of Agriculture in Canada

Cost of climate extremes

Significant damage or loss of production every year

Programs for Agricultural Production Losses Only

2010: July: $311M paid for flooded land;
June: $67M paid for drought relief

2006: $110M paid for excess wetness; drought hit the same region later that summer

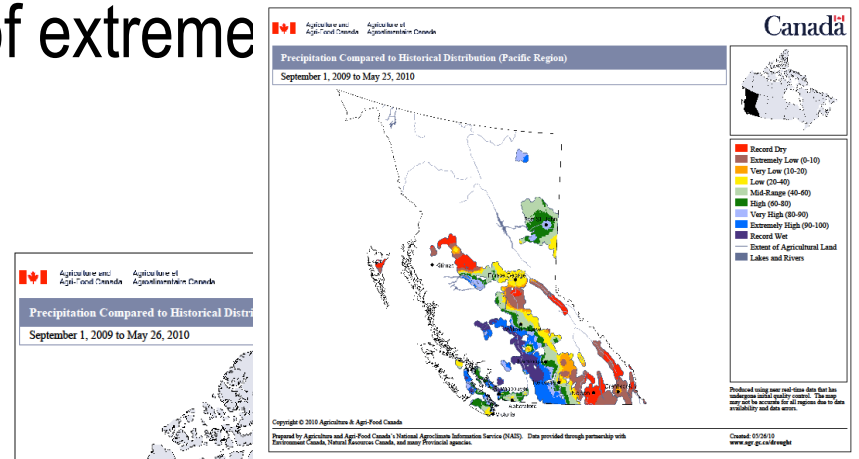
2001-02: cost of drought: $5.8B to Canada's GDP
2001-10: only 2005 had no serious drought problems

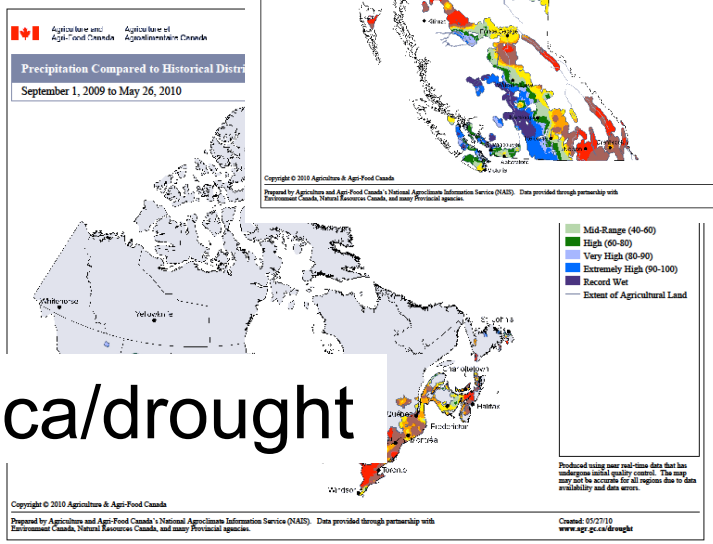
Our Need: To inform Policy

What is the impact on Canada's Agriculture industry?

NAIS: key role

- Assess climate related risk to the Agriculture industry
  - Data collection, screening, monitoring & reporting
  - Current condition updates
  - Extent location & severity of extreme
  - Emphasis on
    - Support to disaster relief
      - income tax deferral
      - Agri-recovery
    - Drought early warning

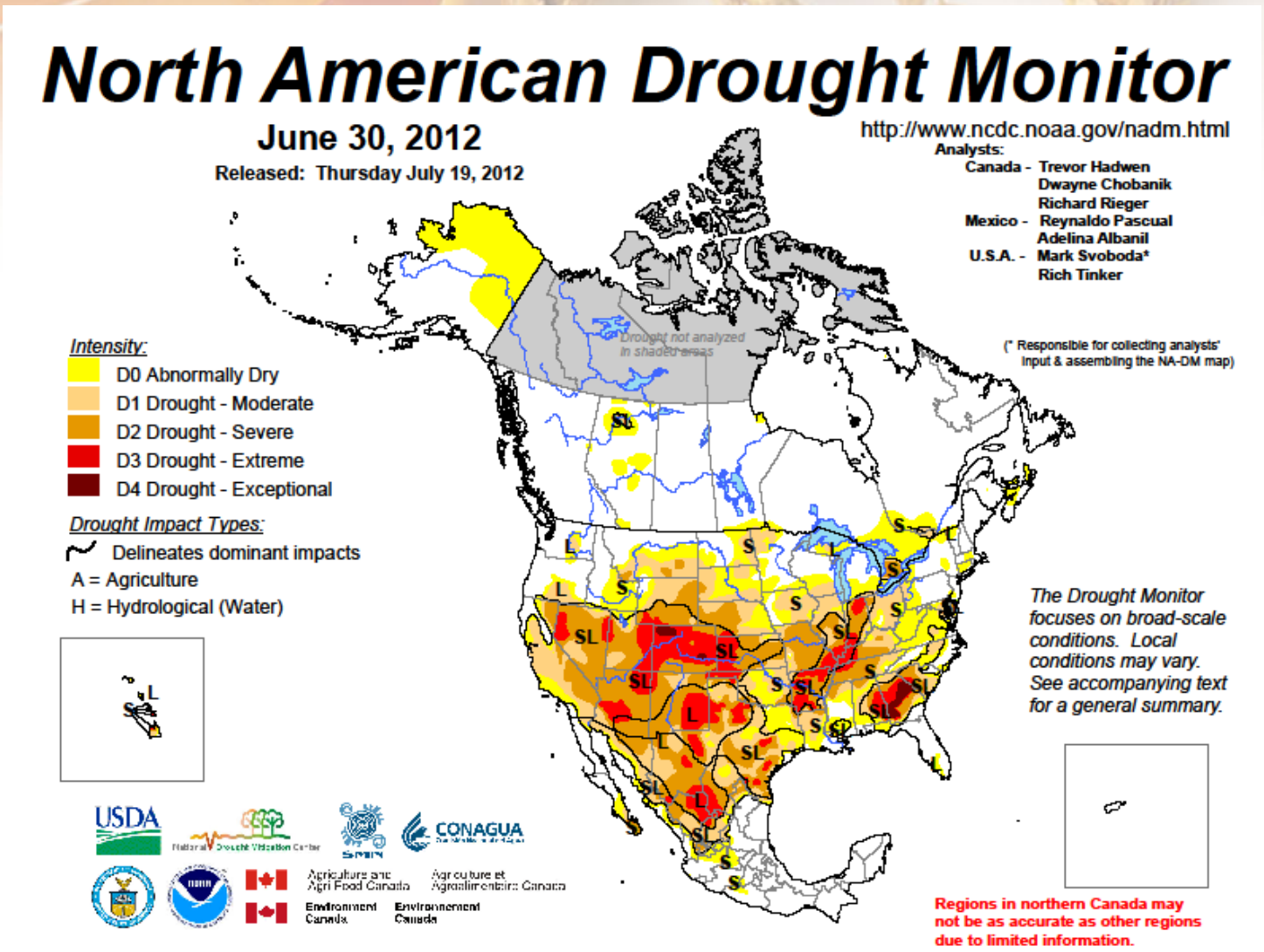




Drought Watch: www.agr.gc.ca/drought

Over 500 maps produced daily

North American Drought Monitor



History

- NADM initiated by US NOAA to build on the success of the US Drought monitor and Canada's Drought Watch

- E.C and NOAA bilateral agreement identifies the NADM,
  - EC has given AAFC the role of as lead for Canada in Drought authorship and other drought monitoring matters.

- NAIS has lead role for AAFC
- EC and NAIS have a long history of close collaboration
- NAIS and NOAA have a long history of close collaboration.
- NAIS and Mexico (NM de M) have not collaborated as closely
  - Strong desire to improve collaboration.

Canada and the NADM

- Collaborative effort
  - National lead authors prepare national maps
  - Rotational NADM lead country integrates the 3 national maps
- NAIS coordinates activities in Canada
  - Input from forestry & surface water agencies
  - NAIS focus is agriculture
- Canada has a team of regional staff who verify local conditions
  - High demand on the limited resources available
  - Branch reorganisation may reduce availability of staff in the regions
- Our end users
  - Ongoing need to better define who they are
  - Canadian end users are primarily a limited number of federal and provincial resources specialists

Canada and the NADM (cont'd)

- Drought in Canada has unique aspects:
  - Strong focus on rainfed agriculture
  - Large differences in drought impacts between west and east
  - Less concern about water shortages than US and Mexico
  - Less political pressure than the US;
- NADM indices are not easy to interpret for average end user
  - External Canadian users prefer precip totals and percent normal; they have their own means to interpret implications from these data
  - NADM indices are relevant for our internal resource specialists

Advances by NAIS

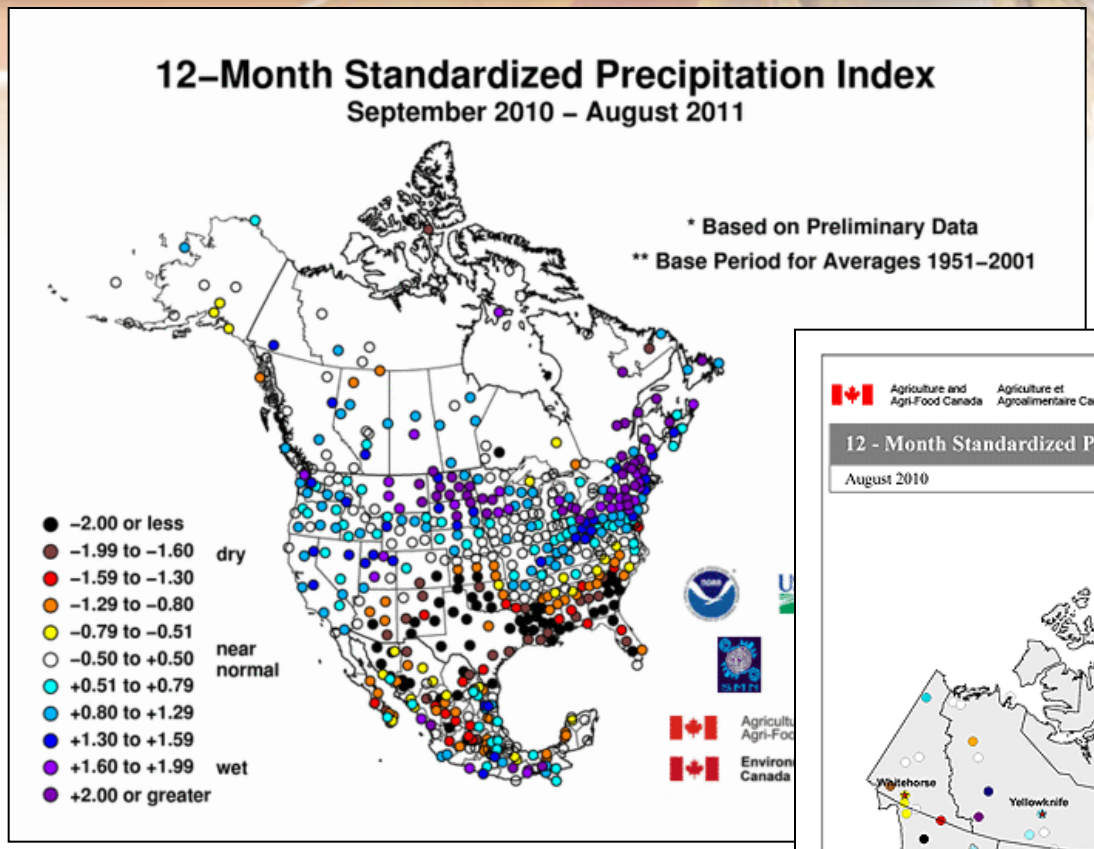
- Increased monitoring network
- Ag Impact Monitoring
- VegDRI
- Blended Indices
- Remote Sensing products
- Relative drought indices for forested areas
- Evaluation of SWSI about to start

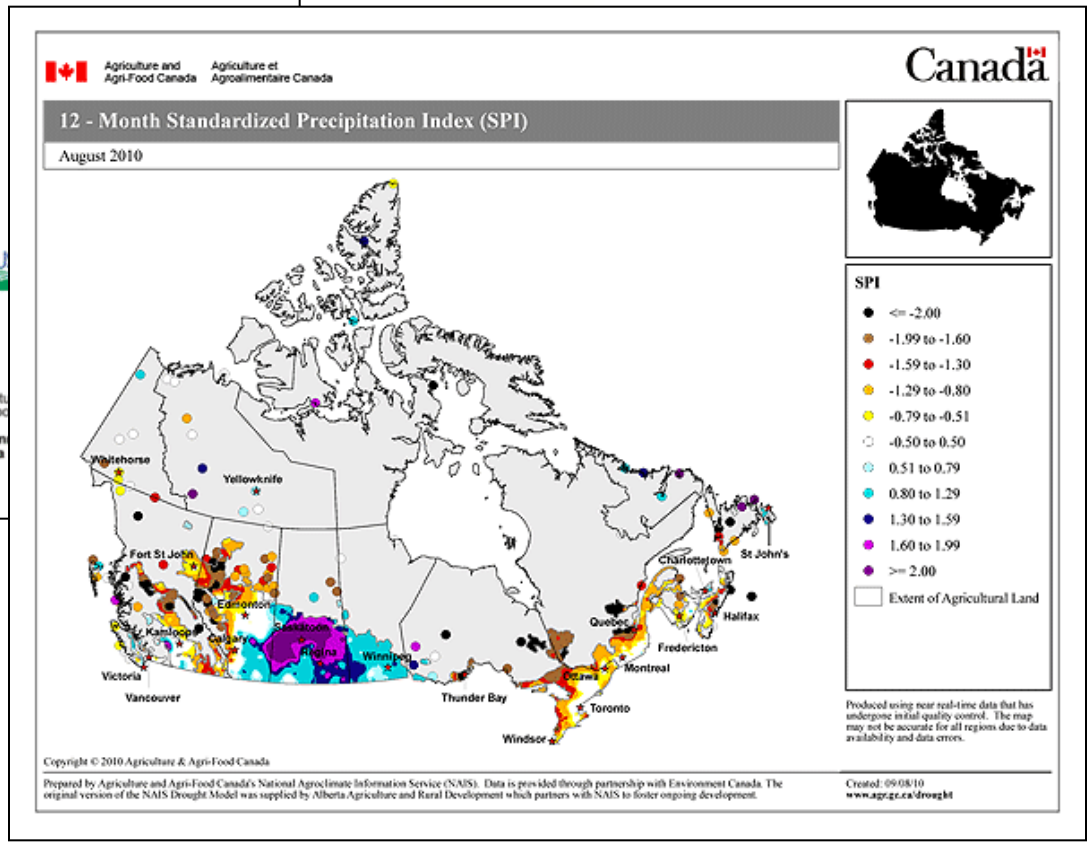
CoCoRaHS is a pilot in Manitoba in 2012 …

The Community Collaborative Rain, Hail and Snow Network is a national grassroots community based high density precipitation network across the United States, and **now Canada**.

www.cocorahs.org/

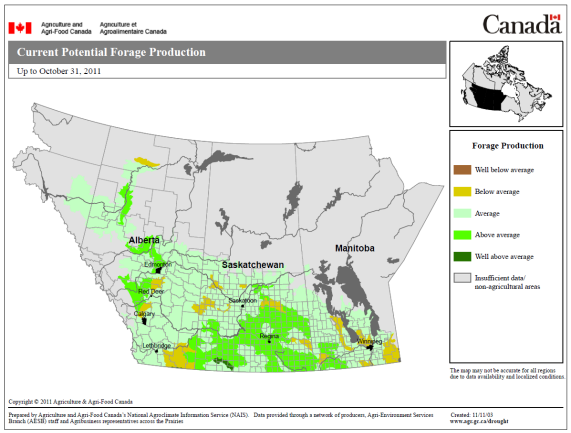
Obvious Differences in Coverage

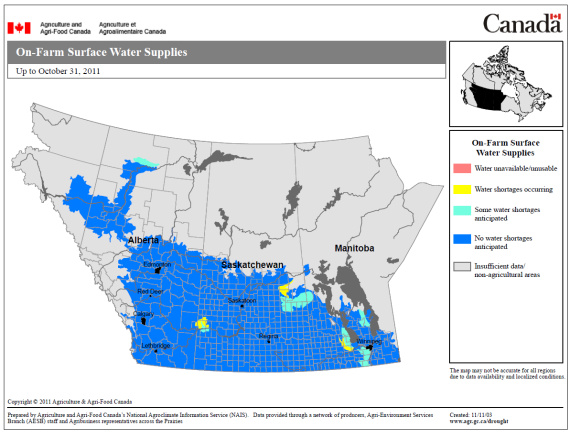


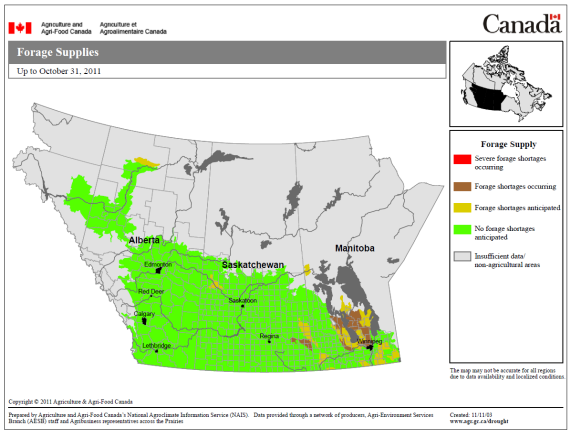


Assessing the Impacts of Drought

- Agriculture and Agri-Food Canada coordinates a network of approximately 350 volunteer farmers in the prairie region, who provide information on the impacts of drought and other extreme weather impacts.
- For over 10 years we have been collecting information on agricultural water supplies, forage supplies and forage productions.



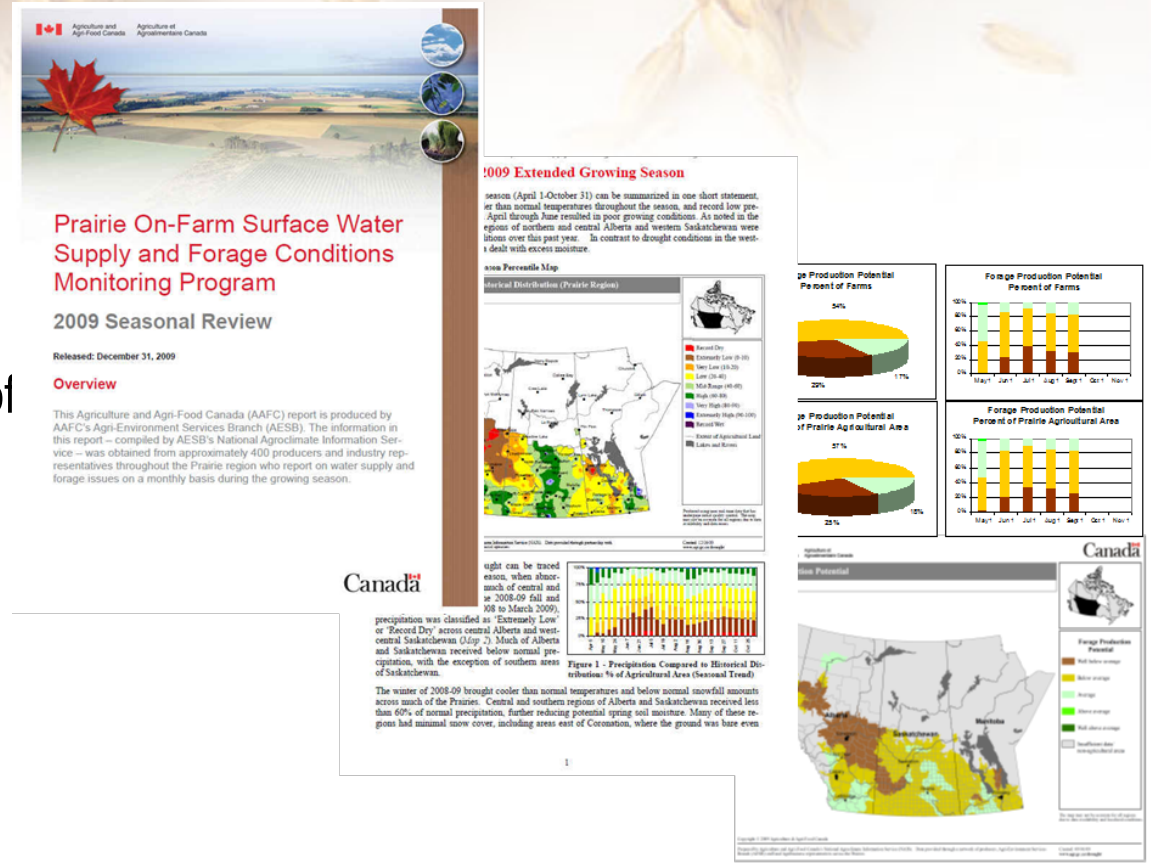




Agroclimate Impact Monitoring

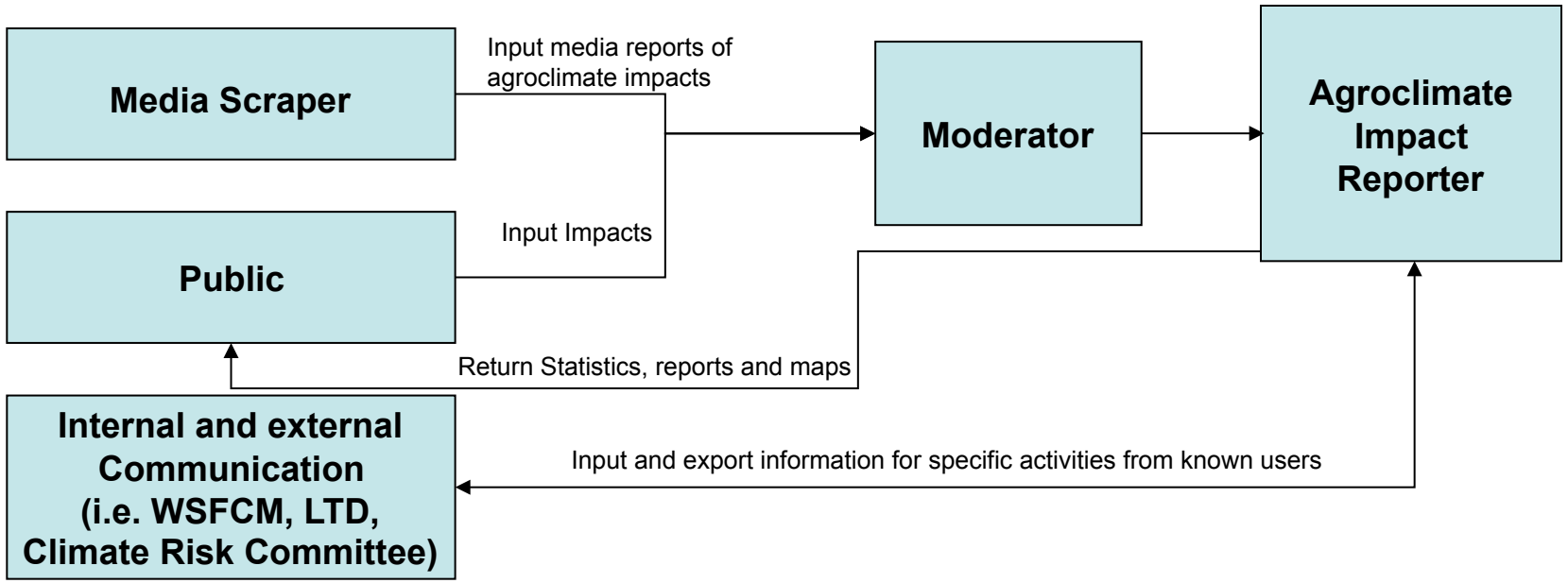
NAIS has:

- Developed a new online data collection tool (Agroclimate Impact Reporter)
- Increased the density of the volunteer network
- Expanded the geographical scope of the program
  - Included B.C. in 2012
- Increased the value of the information collected
  - Linked to ag statistics (e.g. number of farms affected).

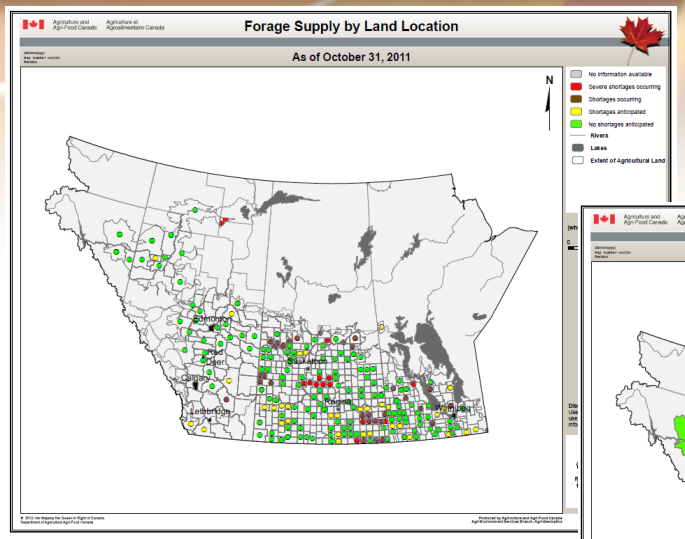


The Agroclimate Impact Reporter (AIR)

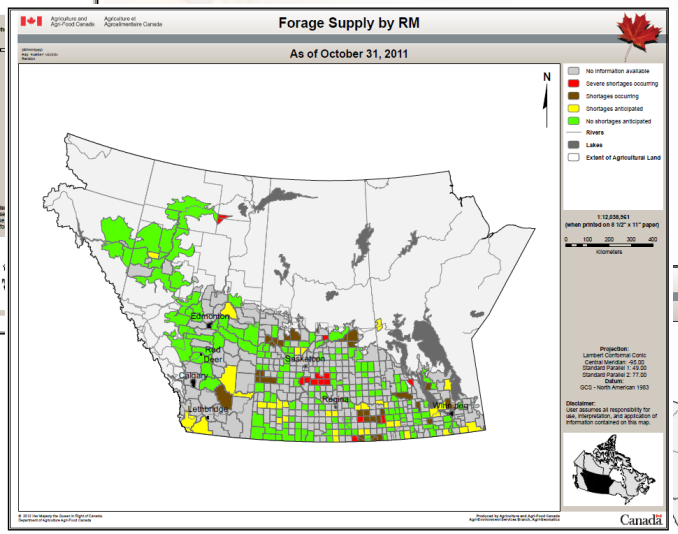
- The Agroclimate Impact Reporter meets the need for a **National Agroclimate Impacts Database** and a tool to electronically collect, integrate, manage and display various forms impacts of climate on the agricultural systems throughout Canada.
- The AIR allows anonymous sources as well as registered users to easily input data for the assessment of drought, floods and other climate related impacts.



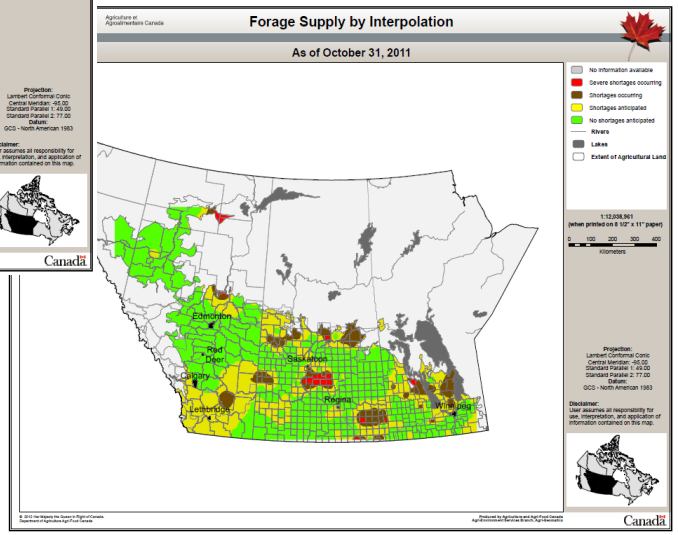
Examples of Output from the AIR System



Point values



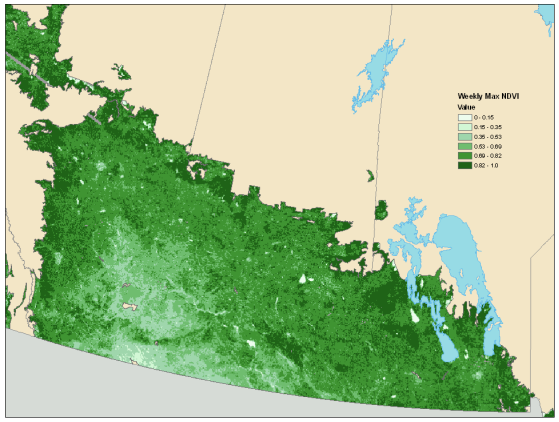
Point values used to classify Municipalities

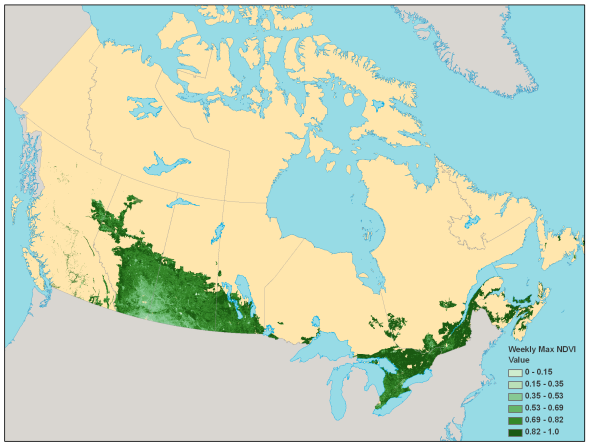


Interpolated to provide a complete coverage

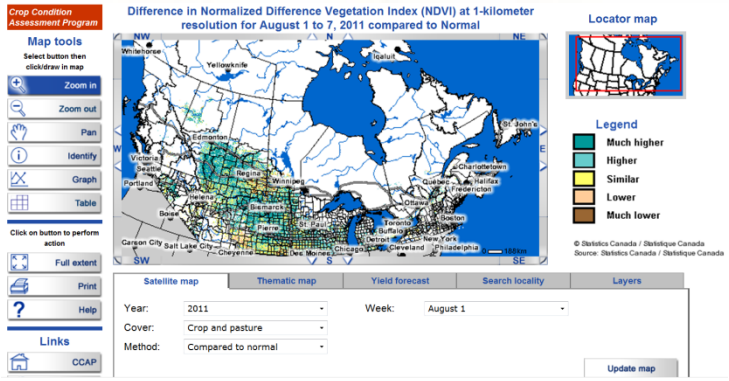
Increase Use of Remotely Sensed Data

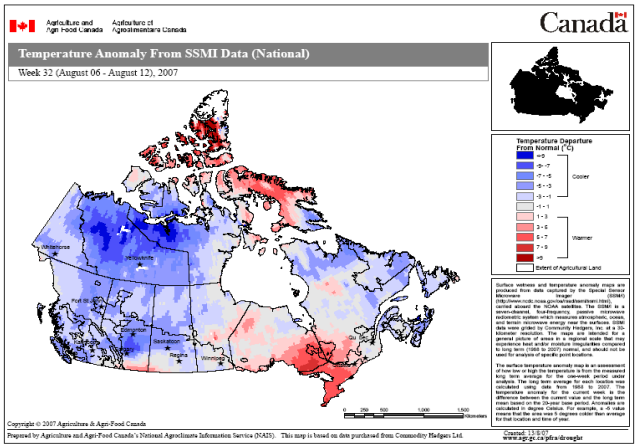
Near-Real-Time NDVI composite generation from MODIS



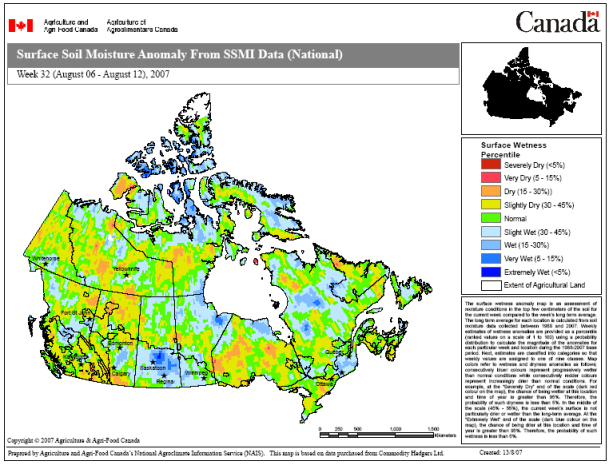


Weekly NDVI, AVHRR Data





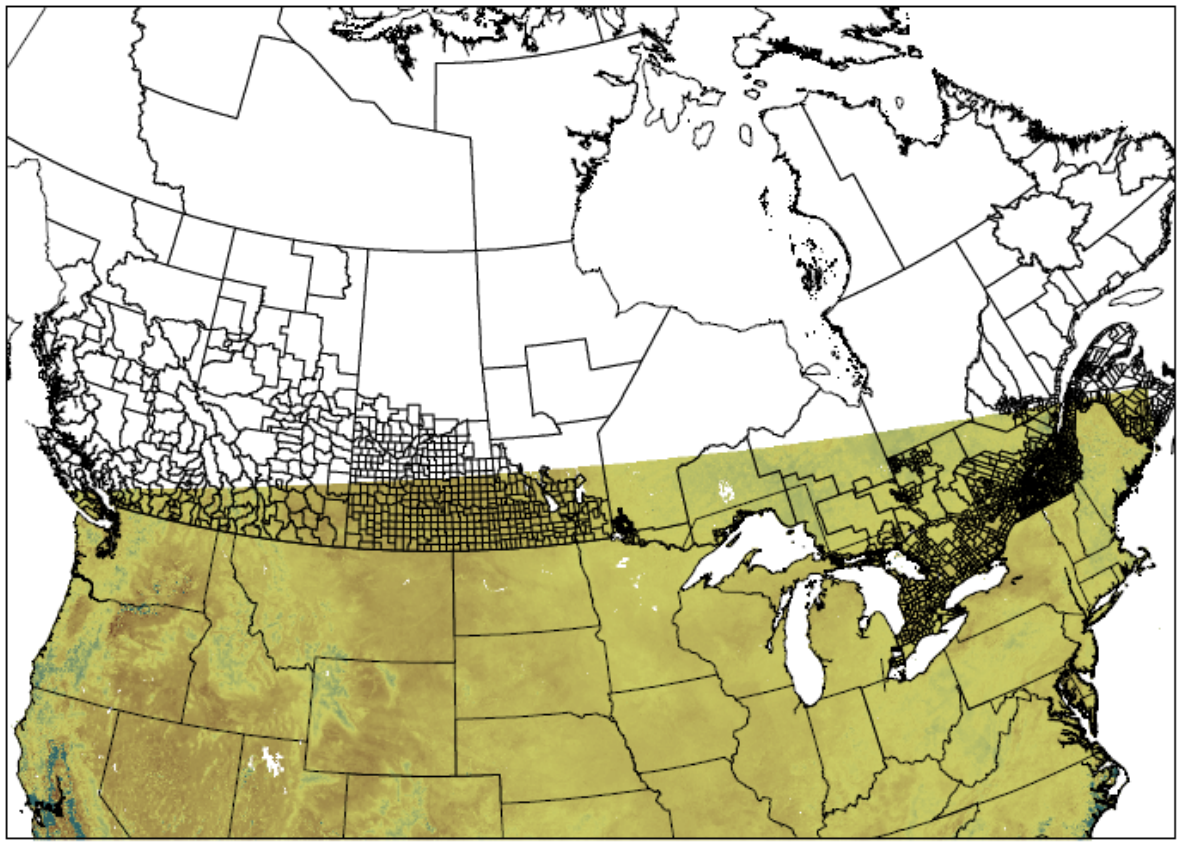
Weekly NRT surface wetness and surface temperature anomaly data from passive microwave data



Potential to Expand VegDRI to Canada

Prospects of expanding VegDRI over the major agricultural regions of Canada to support Canada`s monitoring ability is promising.

Canadian VegDRI Pilot Project Coverage



-Canada has weekly NDVI coverage from MODIS (S of 60^{O} N) and AVHRR (Ag Zone). that has been processed by USGS.

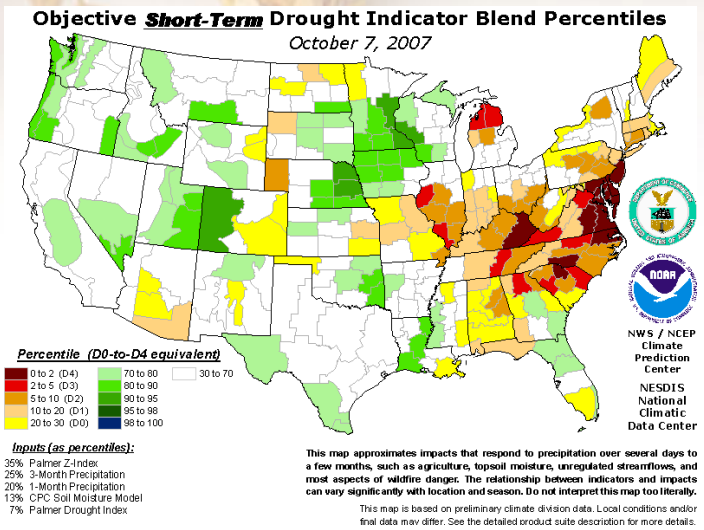
-Potential to expand VegDRI to 60^{O} N

Developing Blended Indicators

- Canada will be attempting to develop Blended Indicators.
- This will allow us to operationally Integrate multiple indicators in a weekly or monthly update using a percentile ranking method
- This is not a easy task:
  - Convert all our data types to percentiles
  - Determine the appropriate blend or more likely blends
  - Data history may be an issue. Would need serially complete data, so could not be computed on station data

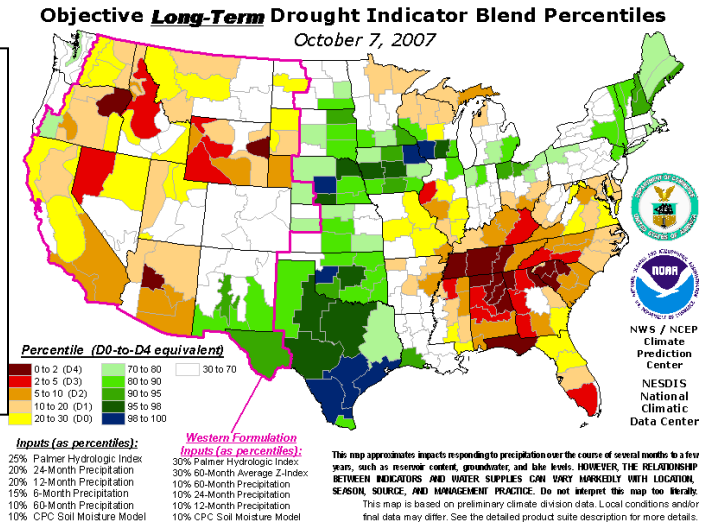
Short-Term Blend

35% Palmer Z Index
25% 3-Month Precip.
20% 1-Month Precip.
13% CPC Soil Model
7% Palmer Drought Index



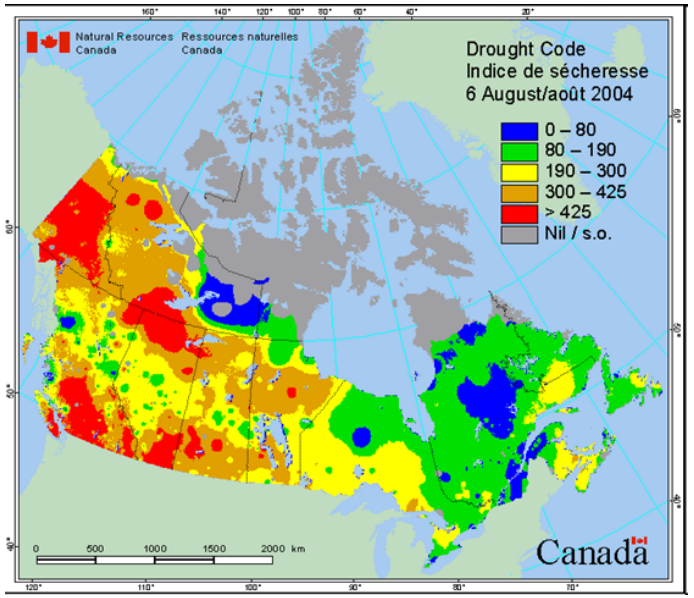
Long-Term Blend

25% Palmer Hydro. Index
20% 24-Month Precip.
20% 12-Month Precip.
15% 6-Month Precip.
10% 60-Month Precip.
10% CPC Soil Model



Developing Indicators for Forested Regions

- The Canadian Forest Service currently uses absolute indicators for drought monitoring specifically for forest fire applications
- Relative indicators are being developed using Climate Moisture Index and the Fire Weather Drought Code (moisture deficit accounting indicator).
- Work has begun on creating a Relative indicator for the Drought Code using our percentile classes



North American Climate Services Partnership

- Established between Canada (EC) the US (NOAA) and Mexico (NM de M) in January 2012
- Intended to facilitate the exchange of information, technology and management practices related to the development of climate information and the delivery of integrated climate services for North America.
- Four initiatives put in place:
  - Drought selected because of the NADM
  - NAIS is Canadian Lead
  - Drought Plan drafted to move NADM to ”next level”
    - End user analysis
    - Improved reporting

Summary

- Canada has made significant steps in developing tools to advance the monitoring drought.
- Increasing the data networks, adjusting the data models, developing indices for northern regions, and increasing the collection of impact information will significantly improve our ability to accurately assess and analyze drought.
- Increasing the profile of the Canadian Drought Monitor has begun to increase partnership and interest in the product. This will only increase the accuracy of the assessments Canada provides to the NADM.

Thank You!

Canada